**In the Specification:**

Applicants wish to amend the specification as follows:

Please replace the heading before the first paragraph on page 1 with the following new heading and please replace the first paragraph following the heading with the following amended paragraph:

~~Specification~~BACKGROUND OF THE INVENTION

The invention pertains to a method for reloading in a container storage space for standard containers, with a stacker crane for the containers that services the container storage space and can be controlled by a DP (data processing) system for logistical management, which can travel between the storage location of each container and a loading platform of a container transport vehicle that can drive into the region of the container storage space, wherein the stacker crane has a means of picking up the container from the loading platform and/or setting it down onto the platform, such as can be oriented with respect to the latter.

Please insert the following heading on page 3, after line 2, as follows:

SUMMARY OF THE INVENTION

The underlying problem of the invention is to achieve a high throughput of containers within a container yard, to lower the costs and to reduce the down time in case of defects, while at the same time boosting the economy of the container handling yard.

Please replace the third paragraph on page 3 with the following amended paragraph:

~~One benefit of the invention is the~~The illustrative embodiments provide quick and flawless handling of the loading and unloading process of transport vehicles, made possible

by automation. In the present application, the constantly recurring identical loading and unloading sequences are broken down into work steps and each of them is automated. The sequence of individual automated work steps with no interruption in time, such as require a shorter time to accomplish than the manual steps, and the mistake-free processing achieve a beneficial shortening of the time of the loading and unloading process and thus also boost the throughput of the containers handled.

Please replace the second and third paragraphs on page 4 with the following amended paragraphs:

Furthermore, ~~it is beneficial that~~in the illustrative embodiments, identification points defined by means of a calibrated camera system on the loading platform of the transport vehicle or the container and their coordinates are transmitted to the DP system of the logistical management. From the identification points, the DP system determines the coordinates of the means of fastening of the transport vehicle or of the container being unloaded (the corresponding system of coordinates describes at least a space reached by the ~~fastening means~~fastener of the load suspension device of the stacker crane). This method enables a quick and error-free detection of the position of the ~~fastening means~~fastener for the container or that of the container itself, contributing to reduce the loading time for a transport vehicle.

~~It is especially advantageous for~~In the illustrative embodiments, the DP system of the logistical management ~~to compare~~compares the coordinates of the identification points with data about the container being loaded, which is stored in the DP system, and ~~determine~~determines the ~~fastening means~~fastener being assigned to this container and the position coordinates on the loading platform of the transport vehicle. The coordinates stored in the DP system as to the size of the container can be compared in good time with the coordinates determined for the ~~fastening means~~fastener of the transport vehicle. If the size of the loading platform of the transport vehicle is sufficient for the container being loaded, the

~~fastening means~~fastener of the transport vehicle to be assigned will be determined. In the event that the loading platform of the transport vehicle is not large enough for the container being loaded, a premature termination of the loading process/loading order can occur, or the time-intensive picking up of the container from the container yard by the stacker crane can be prevented in good time, which represents a considerable time savings.

Please replace the first paragraph beginning on page 5 with the following amended paragraph:

After the successful detecting of the coordinates of the ~~fastening means~~fastener, the loading process can begin at once for the transport vehicle located in the parking position. For this, the stacker crane travels under computer control with the container being loaded above the loading platform of the transport vehicle, overlapping it exactly, and above the position coordinates. The immediate and exact positioning of the stacker crane above the transport vehicle reduces the duration of the loading process thanks to elimination of the manual "approach".

Please replace the second paragraph beginning on page 5 with the following amended paragraph:

~~It is especially advantageous for~~In the illustrative embodiments, the DP system of the logistical management ~~to determine~~determines the ~~fastening means~~fastener and position coordinates of the container from the identification points. This enables a quick and error-free calculation of the position coordinates, for the immediate starting of the unloading order for the transport vehicle.

Please replace the paragraphs beginning on page 5, paragraph 4, through page 7, paragraph 3, with the following amended paragraphs:

The ~~fastening means~~fastener of the loading platform or of the container ~~are~~may be detected by means of a calibrated camera system mounted on the stacker crane, and the load suspension device or the container is moved so that the ~~fastening means~~fastener of the container or of the load suspension device stands congruently above the assigned ~~fastening means~~fastener of the loading platform or of the container. This enables a rapid, error-free, and correct orientation of the container with respect to the loading platform or that of the load suspension device with respect to the container. In contrast with the previous method, the time-intense "approach" of the container or the load suspension device by an operator present in the parking position is eliminated. It is advantageous that the visual monitoring can thus occur from a remote operator, who watches the picture of at least one camera. Likewise, the uninterrupted sequence of the individual process steps helps reduce the loading time.

~~Thanks to the exact~~As a result of precise orientation of the container with respect to the loading platform, the container can be put down on the loading platform of the transport vehicle in such a way that the ~~fastening means~~fastener of the container mate with the corresponding ~~fastening means~~fastener of the loading platform at the end of the lowering process. The disadvantageous "approach" of the load suspension device with the container, guided by an operator present on site, is eliminated and thus produces a beneficial ~~time savings~~timesavings. The container is deposited by the load suspension device on the transport vehicle and released. The loading job of the stacker crane is finished.

~~Thanks to the~~As a result of fast and exact orienting of the ~~fastening means~~fastener of the load suspension device with respect to the container, the load suspension device can be brought up to the container in such a way that the ~~fastening means~~fastener of the load suspension device mate with the ~~fastening means~~fastener of the container. The disadvantageous "approaching" of the load suspension device to the container, guided by an operator, is eliminated and thus produces an advantageous time savings. The container is removed from the transport vehicle and can be unloaded by the load suspension device, which

then stores it temporarily in the container yard. The unloading job of the stacker crane is thus finished.

~~It is especially profitable that~~In the illustrative embodiments, an operator does not have to be on site before, during and after the loading or unloading process. Thus, an operator is available for other activities.

~~It is especially advantageous that~~In the illustrative embodiments, the transport vehicle and possibly the container being unloaded are identified by means of a camera system. By elimination of visual and manual identification, the resulting data are transmitted faster and free of error to the DP system of the logistical management.

For detection of the coordinates of the identification points of the loading platform or of the container, an operator supported by a user-defined interface on a monitor screen of the DP system of the logistical management ~~uses~~may use a marking mechanism to select the identification points of the loading platform or of the container on the user-defined interface. The user-defined interface shows the image of the camera system. An operator who selects the identification points of the loading platform or of the container of the transport vehicle or container represented on the user-defined interface with the marking mechanism, contributes to the error-free detection and quick calculation of the coordinates of the ~~fastening means~~fastener of the loading platform of the transport vehicle.

Another automation technique which reduces the loading time or unloading time can be accomplished in that the coordinates of the identification points of the loading platform or of the container are automatically detected by a computer system and transmitted to the logistical management.

The process step described in claims 1 and 2 for determination of the position coordinates can be implemented in at least two different ways. First, ~~it is advantageous to detect~~ the coordinates of the loading platform or of the container of the transport vehicle can be detected in the loading and unloading zone. At this time, the transport vehicle is already identified and the assigned container is likewise known by virtue of the loading order. This allows the DP system of the logistical management to recognize early on whether the transport vehicle is suitable to accommodate the container being loaded. If the ~~fastening~~

~~means~~fasteners of the loading platform of a transport vehicle are successfully assigned, the loading process will continue; otherwise, the loading process, if already started, will be interrupted.

Please replace the third paragraph on page 7 with the following amended paragraph:

~~Equally advantageous is~~In the other embodiment of the invention of the process step described in claim 1 for determining the position coordinates~~. The~~, the detection of the coordinates of the loading platform of the transport vehicle or of the container in this case occurs in the identification zone. This allows the DP system of the logistical management to recognize early on whether the transport vehicle is suitable to accommodate the container being loaded. Once the ~~fastening means~~fasteners of the loading platform of the transport vehicle are successfully assigned, the loading process will continue; otherwise, the loading process, if already started, will be interrupted.

Please replace the first paragraph beginning on page 8 with the following amended paragraph:

The position coordinate of the container is described by the vertical position of the upper edge of the identification points of the container and by the intersection of the diagonals of the identification points of the container, which describes the relative target position of the container. By selecting the upper edge of the identification points (~~fastening means~~fastener) of the container as an element of the position coordinate, one can also unload standard containers not having a cover, such as open-top containers, tank containers and/or flat containers. Thus, the favorable choice of the position coordinate enables an adroit and thus time-saving positioning of the automatic stacker crane above the container being unloaded.

Please replace the third paragraph beginning on page 8 and the paragraphs following through page 13 with the following amended paragraphs:

Regardless of where the detection of the coordinates occurs, a wrong position of one or more ~~fastening means~~fasteners will be evident on the user-defined interface of the DP system. The operator recognizes the wrong positions and consequently notifies the driver of the transport means. He will correct any wrong positions of the ~~fastening means~~fasteners in good time.

Regardless of the way chosen to detect the coordinates, the advantageous choice of the position coordinate will enable the load suspension device to move the container or the load suspension device into the range of the loading platform or of the container, so that the intersection of the diagonals of the ~~fastening means~~fastener of the container or of the load suspension device stands congruent and plumb above the intersection of the diagonals of the ~~fastening means~~fastener of the loading platform or of the container. The container or the load suspension device hanging from the stacker crane is thus situated in the middle above the loading platform or the container and must consequently be oriented in the possibly next work step by a rotary movement of the container hanging from the load suspension device or of the load suspension device. For this, the stacker crane need not travel any further, i.e., the bridge of an ACS and the trolley moving on it have already reached their exact final loading position. In ~~advantageous manner~~the illustrative embodiments, the stepwise approach of the load suspension device, guided by an operator, is eliminated. This procedure enormously simplifies the positioning of the load suspension device or the stacker crane and thus contributes to an extremely large reduction in the required loading time or unloading time.

~~The~~In the illustrative embodiments, simple watching of the loading process or unloading process by an operator is ~~granted~~obtained by a second user-defined interface with four quadrants, each of them representing a pair of ~~fastening means~~fasteners, while each pair consists of a ~~fastening means~~fastener of the loading platform or container, projected by an image from the camera system, and the associated ~~fastening means~~fastener of the container or

load suspension device, projected by a superimposing of a computer-calculated contour of the container or the load suspension device and of the ~~fastening means~~fastener onto the image. Thus, the operator comfortably watches the loading process or unloading process, without having to be present at the parking position.

~~It is an exceptional benefit of the present invention that~~In the illustrative embodiments, any deviation between the position of the container being loaded or the load suspension device and the position of the loading platform or the container being unloaded can be determined in the DP system of the logistical management for a fine-tuned positioning, in that the second user-defined interface of the logistical management has a marking mechanism with which the operator selects at least one identification point of the loading platform or of the container. The thus-determined ~~exact~~precise orientation of the loading platform or of the container is ~~needed~~used to orient the container with respect to the loading platform or the load suspension device. A deviation of the orientations recognized by the DP system of the logistical management results, during the next step of the work sequence, in a correcting of the position of the container or the load suspension device. The simple detecting of the position of the loading platform or container, the direct availability of the data in the DP system of the logistical management, and the excluding of errors from the data result in an exceptional time savings.

~~Just as advantageous is the configuring of the invention so that~~In the illustrative embodiments, any deviation in position of the container being loaded or the load suspension device with respect to the position of the loading platform or the container being unloaded is automatically recognized by a computer system for fine positioning.

When a deviation exists in the position of the container being loaded or the load suspension device with respect to the position of the loading platform or the container being unloaded, the container or the load suspension device is turned so that the ~~fastening means~~fastener of the container or of the load suspension device stand congruently and plumb above the ~~fastening means~~fastener of the loading platform or container. Such a fast and correct orienting of the container with respect to the loading platform or that of the load suspension device with respect to the container occurs automatically, based on the computed

deviation. ~~It is unusually advantageous that a~~ A tilting of the transport vehicle in its lengthwise and/or transverse direction, caused for example by uneven ground, does not have harmful impact on the loading process. The stepwise approach of the load suspension device with or without the container relative to the loading platform or the container ~~is~~may be eliminated, which produces an exceptional reduction in the time required for the loading or unloading of a transport vehicle.

The swift setting down and releasing of the container from the load suspension device or the swift approach of the load suspension device to pick up the container and the locking together of the ~~fastening means~~fastener is guided by an operator or automatically by a computer system. Since the container or the load suspension device is ~~exactly~~precisely located above the loading platform or the container and is correctly oriented, and the DP system has determined the vertical position of the loading platform or the container, an immediate and continuous motion for depositing the container or the load suspension device can be carried out, and it can be concluded sooner than the manual "approach". The locking together of the ~~fastening means~~fastener of the container and those in the loading platform completes the deposit of the container. After the load suspension device is no longer loaded with the container, which is indicated by the triggering of pressure sensors, the container can be released from the load suspension device and fastened to the transport vehicle. The locking together of the ~~fastening means~~fastener of the load suspension device and those in the container completes the picking up of the container. The container is fastened to the load suspension device and the stacker crane places it in the container yard for temporary storage. Thus, the unloading job order is complete.

The continuous sequence of process steps enables a fast loading and unloading of a transport vehicle. The time saved in this way is available for other loading or unloading processes. Consequently, the throughput of containers handled in a container yard can be increased, which represents an efficiency boosting and likewise a reduction in the transport time of the transported freight.

Furthermore, ~~it is advantageous that~~ an adjustment of a stacker crane ~~is~~may be possible at any time and with little expense by using the method described in claim 16. It

should be kept in mind that geometrical deviations in a camera provided for use on the stacker crane can be produced by structural part tolerances, manufacturing tolerances, irregularities in the lens and/or optical errors, and can be circumvented by a calibration done prior to use of the camera. During operations, the image from a camera used on the stacker crane ~~is~~may be continuously corrected by means of a correction algorithm obtained from the calibration. Thus, the correction algorithm specific to the camera is applied to each image of a camera by the DP system of the logistical management. Consequently, each camera used has substantially identical optical properties if its corresponding correction algorithm is applied. In addition, the preliminary calibration allows the DP system of the logistical management to remotely measure the familiar objects being viewed, in accordance with the laws of optics.

By using this calibrated camera, a further adjustment of the position of the stacker crane can now be carried out. Per claim 16, the stacker crane first moves over a reference point situated at any given position within the container yard, so that at least one camera of the camera system catches the reference point. The DP system of the logistical management compares the new position of the reference point, calculated from the camera image, with its known position of the reference point and, if any deviation is present, it determines an offset for the stacker crane. Under the assumption that the reference point in general does not shift, a correction can be made in the position coordinate of the stacker crane by the DP system of the logistical management adding the offset to the calculated position data of the stacker crane. This ~~is especially profitable~~may be useful in the case of a length change in the running rails of the automatic container stacker (ACS) crane, which is an expansion of length in summer and a contraction of the running rails in winter due to the temperature. Since the DP system of the logistical management ~~determines~~may determine the position in terms of an absolute length measurement of the distance traveled by the stacker crane, the temperature-sensitive arrangements and positions that the stacker crane actually travels can be displaced from the position calculated by the DP system of the logistical management. Thus, ~~in advantageous manner,~~ it ~~is~~may be possible to correct an erroneous calculation of the position of the stacker crane caused by these factors of influence. ~~What is especially advantageous in~~

~~this case is that the~~The stacker crane can be quickly adjusted as often as desired and at any given time.

~~It is especially advantageous to arrange several~~Several reference points can be arranged within the container yard. After the stacker crane has placed itself above one of these reference points, the DP system of the logistical management can compare the position of the reference point already known to it with the new position calculated from a camera image, and calculate any offset for the stacker crane associated with the reference point. In the event that several reference points are located along the linear path of the stacker crane and one of the offsets of these reference points determined in a narrow time domain has a nonsystematic deviation, this indicates ground shifting in the vicinity of the affected reference point, which is afterwards introduced into the calculations for positioning of the stacker crane by the DP system of the logistical management as a correction. In this way, one can avoid any wrong interpretations of length expansions.

~~It is especially advantageous for the~~The container yard ~~to~~may have a super-reference point, with which each camera on the stacker crane can be adjusted relative to it. Replacing a camera mounted on the stacker crane due to a technical defect, etc., requires the onetime adjustment of a newly installed camera on the stacker crane. By using the super-reference point, the DP system of the logistical management can determine a correction vector and assign it to a new camera mounted on the stacker crane. The repair and adjustment time and thus the down time of the stacker crane are profitably shortened. The super-reference point ~~is advantageously~~may be situated at one position in the container yard that is independent of outside influences of the above described kind. The stacker crane travels with the newly installed and already calibrated camera above the super-reference point so that the newly installed camera detects it. The DP system determines the position of the super-reference point and compares the data thus obtained with the already stored data about the super-reference point. If there is any deviation in the data, a correction vector will be assigned to the newly installed camera, and it will be used during each position computation done on the basis of this camera. The timesaving achieved due to the swift adjustment of the newly

installed camera on the stacker crane can be used profitably for loading and unloading processes.

~~Description of figures:~~BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a top plan overview of a container handling yard,

Figure 2 is a side elevation of an identification zone for detection of transport vehicles,

Figure 3 is a top plan section of a container handling yard, container storage space and parking position,

Figure 4 is a side ~~view~~elevation of the area shown in figure 3,

Figure 5 is a side elevation representation of the viewing angle of the camera placed in the parking position,

Figure 6 is a view of first user-defined interface,

Figure 7 is a side elevation representation of the viewing angle of the camera arranged on the side of the automatic container crane,

Figure 8 is a side elevation representation of the viewing angle of the camera arranged on the side of the automatic container crane,

Figure 9 is a view of a second user-defined interface, during a loading process,

Figure 10 is a view of a user-defined interface at the end of a loading process,

Figure 11 is a side elevation another embodiment of an identification point,

Figure 12 is a top plan view of another section of a container handling yard, container storage space and parking position,

Figure 13 is a side elevation of another representation of the viewing angle of the camera arranged in the parking position,

Figure 14 is a top plan view of representation of the arrangement of a reference point.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Figure 1 shows an automated container terminal 24 for containers 1, where trucks 7 (figure 2) are loaded and unloaded at the land side. In an identification zone 25, arriving and departing trucks 7 are identified and/or surveyed. An arriving truck 7 is identified and the data thus generated, which are required for the loading and unloading, are transmitted to the

DP (data processing) system (not shown) for logistical management. After this, the truck 7 moves to the loading or unloading zone 6 by roadways 26.

Please replace the first paragraph on page 15 through the second paragraph on page 16 with the following amended paragraphs:

Figure 6 shows the monitor 12 with the image of the camera 10, by which the operator can observe and control the parking process of the truck 7 and the loading and unloading process. For the loading of the truck 7 in the parking position 8, the position of the loading platform 31 of the truck 7 has to be measured. For this, a marking mechanism such as a crosshair 14 is superimposed on the image of the camera 10, with which the operator can select identification points. These identification points are the ~~fastening means~~fasteners of the loading platform 31 of the truck 7, the so-called twist locks 13. The coordinates of the twist locks 13 are transmitted to the DP system of the logistical management in order to calculate the position coordinate of the loading platform 31. The DP system of the logistical management calculates the diagonals 16 of the twist locks 13 and their point of intersection 17. The intersection 17 describes the vertical position 15 of the loading platform in the system of coordinates. This computation is made possible by a previous calibration of the fixed installed camera 10, whose exact position and viewing direction is known.

The container 1 located on the rigid mast 3.3 of the stacker crane 3, as depicted in figure 7, is positioned above the loading platform 31 of the truck 7 so that the point of intersection of the diagonals of the ~~fastening means~~fastener of the container 1 stands congruently and plumb above the point of intersection 17 of the diagonals 16 of the ~~fastening means~~fastener of the loading platform 31 of the truck 7. Thanks to the cameras 18 arranged on the stacker crane 3 and thanks to the chosen type of positioning of the container 1 being loaded above the loading platform 31, the viewing angle 19 of the camera 18 can be restricted, as depicted in figure 8. Due to the different container sizes of 20 ft., 30 ft., 40 ft. to 45 ft., two viewing angles 19.1 and 19.2 are required left and right, disregarding the middle zone of the container 1. In terms of the coordinates of the point of intersection 17 of the

diagonals 16 of the loading platform 31, a viewing range of the camera system 42.1 from –7m to –3m and a viewing range of the camera system 42.2 from +3m to +7m is necessary. Only in these areas are there twist locks 13 of the loading platform 31 adapted to the container 1.

Figure 9 shows the four-part user-defined interface 20 of the DP system of the logistical management. Each quadrant shows one image segment, which is generated by at least one of the cameras 18 arranged on the side of the stacker crane 3. For redundancy reasons and reliability considerations, the four image segments can be generated from the image of a camera, or also from two images of two cameras arranged at the side. It is likewise possible to implement a solution that provides one camera for each image segment. Each image segment shows the ~~fastening means~~fastener, the twist locks 13 of the loading platform 31. The operator can recognize a wrong position for the twist locks 22 and then use an intercom system to ask the driver of the truck 7 to correct this wrong position. The computer-calculated contours of the container 23 are superimposed on the image, showing the operator the actual position of the container 1. The orientation of the container 1 with respect to the loading platform 31 is accomplished by the operator using a marking mechanism, such as a crosshair 24, to once again select the ~~fastening means~~fastener or twist locks 13 of the loading platform 31. The coordinates of the ~~fastening means~~fastener of the loading platform 31 are once again transmitted to the DP system of the logistical management. The actual orientation of the loading platform 31 is calculated from this. Any deviation between the orientation of the container 1 and the orientation of the loading platform 31 is determined by the DP system of the logistical management and the container 1 is rotated on the mast 3.3 by means of the load suspension device 3.4 so that all ~~fastening means~~fasteners of the container 1 stand congruently and plumb above the ~~fastening means~~fasteners of the loading platform 31.

During the lowering process, the computer-calculated contour 23 of the container is newly calculated at any time and superimposed on the image frozen at the start of the lowering process, as represented in figure 10. At the end of the lowering process, the ~~fastening means~~fasteners of the container 1 engage with the ~~fastening means~~fasteners of the

loading platform 31 of the truck 7. The operator watches and controls the loading process on the monitor as the container 1 is set down.

Please replace the last paragraph beginning on page 16 and ending on page 17 with the following amended paragraph:

Figure 11 shows a modified identification zone 25, in which the arriving truck 7 including a possibly present container 1 is identified. The identification of the truck 7 involves the recognition of the license plate 28, 29 of the transport vehicles and the identification number 30 of the possibly present container 1 by means of the cameras 27 arranged at the identification zone 25, which are connected to the DP system of the logistical management and transmit the so-generated data to it. In addition to the work step described in figure 2, the possibly present container 1 and/or the empty loading platform 31 of the truck 7 are then measured. The truck 7 is detected from the side 32 and from above (top view) 33 by means of the camera 27. The detection of the identification points of the loading platform 31 (or container 1) as described in figure 6 does not occur in the loading and unloading zone 6, contrary to figure 6, but rather in the identification zone 25. The course of the detection of the identification points remains identical. At the same time, there is an automatic measuring of the height 34, 35 of the ~~fastening means~~fastener being used by the camera 27. The coordinates found are transmitted to the DP system, and these represent the relative target position of the container being unloaded, since they pertain only to the truck 7. The driver of the truck 7, after a successful identification and measurement of the truck 7, receives an access authorization in the form of a magnetic card or chip card (not shown). The magnetic card also contains all relevant data concerning the handling order.